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Market Response to the Legitimation of a Brand Appeal

David B. Montgomery*
and
J. Scott Armstrong**

May, 1969

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INTRODUCTION

In most frequently purchased, branded product markets, the consumer has little to choose from in terms of significantly differentiated products. The staggering array of manufacturers' claims and counter claims of brand superiority seem to leave consumers bewildered or cynical. One wonders what would happen if a brand appeal could be legitimated to consumers. What would characterize the consumers who would respond?

The American Dental Association's endorsement of Crest on August 1, 1960 provides us with an example of a legitimated appeal.[1] The endorsement received widespread coverage. Procter and Gamble used full page newspaper ads in several hundred markets to thank the A.D.A. for its contribution to public service.[2] The joint product of heavy P & G advertising and legitimation of the brand appeal by the A.D.A. was a dramatic gain in market share for Crest from about 12% in July 1960 to about 35% in the period after the endorsement. This gain came at the expense of virtually every brand and it came in spite of heavy dealing activity by other brands. Thus the dentifrice market during this period provides a case example of consumer behavior in a market undergoing substantial change.

Our objectives in this study are twofold. First, we want to begin to evaluate a class of consumer panel measurements which migh provide predictive

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[1] The Yale communication studies of source credibility would seem to lend indirect support to the notion that the endorsement enhanced the believability of Crest's appeals. See [Hoveland, et. al., 1953]

[2] See [Bliven, 1963]

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and diagnostic information about market response. The data we use for this purpose are from a social-psychological quiz administered to nearly four thousand housewives in MRCA's National Consumer Panel about three months prior to the A.D.A. endorsement.[3] This quiz gathered data on buyer's self-designated interest and opinion leadership on a rather broad range of topics. It also asked the buyer to assess her likely response to seven hypothetical, but plausible, new products on a scale from "try immediately" to "never". Data were also gathered on media habits and preferences, and social contacts. Should these measures prove useful, commercial panel operators such as MRCA might find it profitable to provide these measures on a continuing basis. Secondly, we are interested in ascertaining whether we can specify, by prior reasoning, certain salient characteristics of consumers who responded to the Crest endorsement.

PRIOR THEORY

Even though its basic formulation did not change, Crest was probably viewed as "new" by much of the market subsequent to the endorsement in that it now had a major additional product attribute -- a legitimated claim of decay preventive effectiveness. The notion that Crest was probably viewed as "new" subsequent to the endorsement led us to consider the possibility that the literature on the diffusion of innovations might yield useful insights in constructing a prior model. Our concern at this point was whether or not we could develop a reasonable prior model to predict who would try Crest after its endorsement. Since our interest was centered upon response to the

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[3] We are indebted to Dr. I.J. Abrams of M.R.C.A. for making these data available at nominal cost. Peter Rossi of the National Opinion Research Corporation and Elihu Katz of the University of Chicago were consultants to M.R.C.A. on the development of this quiz.

legitimation of the brand appeal, attention was focused upon those buyers who were not Crest purchasers in the period immediately preceding the endorsement.

It should be noted at this point that consumer response to the legitimation of the Crest brand appeal is confounded with both the response to increased promotion of Crest and competitive response to the endorsement. These confounding effects should tend to operate in opposite directions on our response measure. A further confounding aspect of this situation is the intervening variable of the family dentist. His reaction to the Crest endorsement may well have determined the response of a family in many cases. Unfortunately, our data base does not furnish this information.

Rogers [1962] has summarized research relating to the diffusion of innovations and from this research he has tried to develop a tentative theory. At the present time the theory consists of a loosely related set of conceptual variables which have been found to be useful in distinguishing early adopters from late adopters or non-adopters.

Rogers found that the perceived characteristics of the innovation were important determinants of response. He identified the following five characteristics as being important: relative advantage, cultural compatibility, complexity, divisibility, and communicability. Of these, relative advantage seems particularly salient in terms of predicting individual response to the A.D.A. endorsement. The remaining four do not appear to be especially important in the present case.

Rogers also reports that early adopters and innovators tend to rate higher in terms of opinion leadership and venturesomeness. In addition, impersonal information sources were found to be important at the awareness stage while personal sources were important at the evaluation stage. These results suggested to us that we ought to incorporate relative advantage, venturesomeness, opinion leadership, and exposure to mass communication and personal sources of information within the framework of our prior model.

The prior model specified below draws upon Roger's summary of salient variables in the diffusion of innovations. In our model, we are interested in ascertaining whether conceptual variables developed in other behavior areas will prove useful in predicting response in this market.

Prior Model: Conceptual Variables

Our purpose in this model is to identify a set of conceptual variables which seem relevant, a priori, to the identification of triers of Crest subsequent to the A.D.A. endorsement. These variables are:

R: Relative Advantage: what advantage does the product have for the consumer?

I: Interest: how interested is the consumer in the product class?

V: Venturesomeness: is the consumer willing to experiment with products of this type?

OL: Opinion Leadership: do others ask the consumer for information on the product class?

G: Gregariousness: does the consumer have a lot of social contacts?

E: Exposure to Mass Communication: does the consumer receive a relatively high amount of information from mass communication sources?

Notice that we have added interest to the conceptual variables drawn from Rogers. While Katz and Lazarsfeld [1955] found interest to be related to opinion leadership, it seemed to us that it might also exert an independent effect on consumer response. Thus it was included, even though there was danger of high degree of collinearity.

The conceptual variables outlined above form the basis for a rather primitive model. Taking each variable separately, we would predict that a high score on each variable should be positively related to the trial of Crest in the post A.D.A. period.

OPERATIONAL MEASURES

Before we may test our prior model, it is necessary to develop operational measures for the variables. In this initial test of the model we have used rather gross measures of many of the variables. We anticipate being able to suggest somewhat more refined approaches in the near future. We consider: 1) our operational measures of the conceptual variables, 2) the response measure, 3) the other variables in the analysis, and 4) the data screening procedures which were used.

In the case of Crest it seemed that the presence of children would give Crest a relative advantage for that family. It was felt that the critical years for tooth decay occur during childhood and adolescence and, further, that adults are more likely to be concerned with the question of tooth decay for their children than for themselves. Thus, our operational measure of relative advantage was taken to be the presence of children (through age 17) in the household.

In the discussion below we develop several indices as weighted combinations of certain measures. The weights, while ad hoc, represent our prior notions about the relative contribution of these measures. The procedure used to develop these prior weights was first to agree on the measures to use and then for each of us to assess independently the rank order importance of these measures to the indices we were developing. Our rankings were in agreement and were used as the weights in the indices.

Interest and opinion leadership measures were developed from a weighting of response to questions on health, raising children, and buying food. The housewife was asked to rate her interest in each of these three topics in terms of whether she saw herself as less interested, as interested, or more interested than most other women she knew. The three response alternatives were coded 1, 2 and 3 respectively, with the highest response number signifying the greatest topical interest. The interest index was then taken as:

I = (3) (Interest Score on Health) + (2) (Interest Score on Raising Children) + (1) (Interest Score on Buying Food).

The opinion leadership index was developed in a similar fashion.

The venturesomeness measure was the result of the housewife's response to the following question:

"An effective pill for the prevention of colds and minor respiratory ailments is about to come on the market. Would you:

1. Try it as soon as possible.
2. Wait until a few friends have tried it.
3. Wait until it is in common use.
4. Probably never try it.

This measure was used to ascertain a housewife's self-perceived "venturesomeness" in a health product class. Her score on the venturesomeness index is the number which corresponds to her response to this question.[4] Note that a score of 1 corresponds to maximum venturesomeness while a score of 4 corresponds to the least.

The conceptual variable "gregariousness" relates to the number of social contacts which the housewife has. Operationally this was defined as a weighted combination of the following measures:

1. The number of persons, excluding immediate family, with whom she had a telephone conversation during the preceding three days,
2. The number of times she had visitors at her house the past seven days,
3. The number of times she was invited out for an evening visit or dinner with friends.

Since we felt that the latter two categories were relatively more important in the measure of gregariousness, we formed an index as:

$$G^2 = (1)\ (\text{Telephone Calls in Past three Days}) + (2)\ (\text{Visitors During Past Seven Days}) + (2)\ (\text{Evening Invitations to Visit During Past Seven Days})$$

In the regression formulation discussed in the next section we used G, the square root of the above index.

Media exposure data for the panel households were available from a previous study run in the Spring of 1959. In this study households kept a weekly diary of their magazine, daytime television, and evening television exposure. A household's score on one of these indices, say daytime television, was determined by the quartile of the entire sample group of households into

[4] Some evidence on the validity of this measure is available in the Magazine Advertising Bureau reports referenced in the bibliography.

which it fell. Our operational definition of exposure to mass communication channels was taken as:

M = (2) (Magazine Quartile) + (1) (Daytime TV Quartile) + (1) (Evening TV Quartile).

As has been discussed, attention in this paper is focused upon buyers who tried Crest subsequent to the endorsement. A trier is defined as any buyer who tried Crest in one of her first twenty-five purchases after the endorsement.[5] A non-trier is one who did not try Crest in one of her first twenty-five trials or in the period of the analysis.[6]

The lack of perfect measures of each variable led us to introduce a new variable. It was postulated that the theory would show up more clearly in cases where the buyers were loyal to one brand. If one were to view brand choice as a probabilistic process, loyal buyers less likely to purchase Crest by "chance". As an operational measure of brand loyalty we used the proportion of purchases devoted to the household's most frequently purchased brand in the period prior to the endorsement. In summary, then, the theory should show up significantly more for people who had been brand loyal prior to the endorsement while the low brand loyalty group is expected to contain a higher percentage of people who tried Crest.[7]

In a similar manner we defined a measure of dealing behavior as the proportion of purchases made on a deal in the period before the A.D.A.

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[5] In retrospect, this time span and number of trials was probably too large. The conceptual variables should have greater power when the trials for this response variable is reduced.

[6] The after A.D.A. endorsement data period extends up to April, 1963, at which time dentifrice was deleted from the panel.

[7] The reliability of this measure between the before and the after endorsement periods was $r = 0.49$; however, this estimate of reliability is expected to be low since the Crest endorsement introduced change into the second time period.

endorsement. A buyer having a relatively high proportion of deal purchases might be considered "deal prone". Since Crest was involved in considerable dealing after the ADA endorsement and in view of the large number of trials and the extended time period over which we are defining the trying response, we would expect this measure to relate positively to trying Crest.

In order to be included in the analysis, a household had to meet the following criteria:

1. It had to have been on the active list of the National Consumer Panel every month in 1960;

2. It had to have at least two purchases of dentifrice in the period before the A.D.A. endorsement and at least four purchases after; and

3. It must not have purchased Crest on the two purchases immediately preceding the endorsement.

In the analysis sample, 998 households out of 1918 satisfied the inclusion criteria, while 993 out of 1917 did so in the validation sample. The results for the analysis and validation samples are given in the next two sections.

SOME EMPIRICAL RESULTS: THE ANALYSIS SAMPLE

The discussion of empirical results will be presented in three sections: 1) regression analysis, 2) tree analysis, and 3) maximum contrast groups.

Regression Analysis

Our prior model of the conceptual variables specifies that the operational measures of relative advantage (R), interest (I), opinion leadership (OL), gregariousness (G), and dealing (D) should all be positively related to trial of Crest in the post A.D.A. period. It also specifies that the operational measures of brand loyalty (L), venturesomeness (V), and mass communications (M) should be negatively related to trial. The results of this regression were:

$$T = 0.814 - 0.503L + 0.135R + 0.010I - 0.008V - 0.009(OL) + 0.002G$$
$$\qquad\quad (-7.88) \quad (4.16) \quad (1.10) \quad (-0.52) \quad (-1.10) \quad (0.12)$$
$$-0.004M + 0.055D$$
$$(-0.87) \quad (0.82)$$

where T = 1 if tried sometine up to 25 trials after endorsement; zero otherwise, and the observations were the 998 households in the analysis sample. The figures in parentheses are the corresponding t statistics for 989 degrees of freedom. The adjusted R^2 was 0.088.

From these results we see that the sign predictions hold for all variables except opinion leadership which was highly collinear (r = 0.52) with interest. If we postulate a chance model having a 50-50 chance of predicting the correct sign, the probability of obtaining 7 out of 8 correct predictions is less than 5%. The t statistics, however, are only significant for brand loyalty (L) and

relative advantage (R).

If we judge the performance of the model based upon its adjusted R^2, it appears that the model is "statistically significant" but not terribly relevant since it only accounts for 6.8% of the variance in the response measure. It is fairly typical to obtain this magnitude of R^2 when analyzing household purchase data by regression analysis.[8]

In sum, the regression results seem to indicate some effect of the variables on market response, but the results are not impressive. However, there are a number of reasons why regression analysis is not ideal for testing our model -- or, more generally, for dealing with household data:[9]

1. There is a substantial amount of measurement error in all variables. Random measurement errors in the predictor variables will lead estimates of the coefficients to be biased toward zero.

2. There are problems from the interaction among the variables in the model. For example, the relationship between venturesomeness and trial is expected to be dependent upon the level of interest.

3. Causal priorities may exist among the variables.

4. There are scaling problems for some of the variables (for all those variables except the dummy variables). This violates the implicit assumption that interval measurement exists.

5. Multicollinearity generally exists among the predictor variables making it difficult to evaluate the separate contribution of each variable.

6. The assumption is generally made that the relationships between the dependent and independent variables can be expressed in terms which are linear in the parameters.

Consequently, we will explore further modes of analysis.

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[8] Low measures of R^2 seem to result in most cross-sectional studies where the sample points are individual households. We know of one researcher who has bragged about achieving an R^2 of .14 -- and his study was of a descriptive nature using a large number of predictor variables. A recent example of R^2 less than .05 was found by Massy, Frank, and Lodahl [1968].

[9] Morgan and Sonquist (1963) provide an excellent discussion of these problems. Their presentation of an alternative technique (Sonquist and Morgan, 1964) is not, however, useful for our objective of model testing. Their procedure requires a continuous response variable where we have a dichotomous one. Further, this method is of the data message variety appropriate for exploratory research, but not model testing.

Tree Analysis

While there are ways of dealing with some of the problems which arise in regression, a simple mode of analysis which avoids most of these problems is what we call tree analysis.[10] In a tree analysis the sample is successively split into mutually exclusive and exhaustive sets based upon the level of the predictor variables. The example in Table 1 should clarify what we mean. First the sample is split into two sets depending upon whether a household was high or low in its brand loyalty in the pre A.D.A. period. The proportion of households in each of these groups who tried Crest is recorded. Then each of these samples is further split on the basis of high or low relative advantage and the proportion of triers in each cell is recorded. The sample is then further split on the basis of interest score, etc.

Tree analysis is also subject to certain limitations. For example, tree analysis places heavy burdens on sample size, generally requires judgement in forming category boundaries, and will result in a loss of sample information whenever a variable which is interval scaled is converted to a categoric measure for the tree analysis. In the present case, the burden on sample size caused us to reduce our set of predictor variables to brand loyalty, relative advantage., interest, venturesomeness, and opinion leadership. Even so, several "data thin" cells emerged by the time we split on opinion leadership.

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[10] Other names for this simple type of analysis are "configurational analysis" [Rogers, 1962, pp. 292-5] or "multilevel cross tabulations".

Table 1

Tree Analysis of Triers: Analysis Sample

High Brand Loyal Purchasers (453/998 = 0.454)

High Brand Loyal																
Total Households	209/453 = .461 [e.g., $\frac{\text{triers}}{\text{\# in cell}}$ = percent of triers]															
Relative Advantage	High 141/279 = .506								Low 68/174 = .391							
Interest	High 49/84 = .583				Low 92/195 = .472				High 19/38 = .500				Low 49/136 = .360			
Venture	High 30/48=.625		Low 19/36=.528		High 41/98=.418		Low 51/97=.527		High 7/17=.412		Low 12/21=.572		High 19/54=.352		Low 30/82=.365	
Opinion Leadership	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
	18/25	12/23	11/21	8/15	5/14	36/84	7/13	44/84	3/7	4/10	7/9	5/12	1/7	18/47	4/11	26/71
	=.720	=.522	=.500	=.533	=.357	=.428	=.538	=.523	=.429	=.400	=.778	=.416	=.143	=.383	=.363	=.366
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Key: Most splits were made at about the mean response; high brand loyal were purchasers devoting .70 or more purchases to their favorite brand; high relative advantage -- indicates the presence of children; high interest was any score 13 or greater; high venture was scores of 1 or 2; high opinion leadership was any score 11 or greater.

Table 1 (continued)

Tree Analysis of Triers: Analysis Sample

Low Brand Loyal Purchasers (545/998 = 0.546)

Low Brand Loyal Total Households	377/545 = .691															
Relative Advantage	High 273/364 = .749								Low 104/182 = .572							
Interest	High 89/122 = .729				Low 184/241 = .762				High 22/35 = .628				Low 82/147=.557			
Venture	High 57/76=.750		Low 32/46=.695		High 100/132= .758		Low 84/109=.770		High 12/19=.632		Low 10/16=.725		High 45/72=.625		Low 37/75=.493	
Opinion Leadership	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
	31/43	26/33	19/26	13/20	17/21	83/111	14/18	70/91	7/13	5/6	7/11	3/5	10/15	35/57	5/6	32/69
	=.720	=.788	=.730	=.650	=.808	=.748	=.778	=.770	=.538	=.833	.637	.600	.667	.613	.833	.463
	A'	B'	C'	D'	E'	F'	G'	H'	I'	J'	K'	L'	M'	N'	O'	P'

The first use we make of Table 1 is to consider the results in cells which are the same on all but one of the predictor variables. For example, cells A and I are the same for all predictor variables except relative advantage.[11] Given that all predictor variables except one are the same, our conceptual variables model predicts that cell A should have a higher proportion of triers than cell I. In this case the directional prediction is correct. For each predictor variable, there are 16 possible pairwise comparisons of this type. The results of this analysis are given in Table 2. The probability column is the probability of obtaining at least as many correct predictions as we actually obtained if the chances of being correct are 50-50.

Table 2

Pairwise Comparison of Predictor Variables: Analysis Sample

Variable	Number of Comparisons Without Ties	Number of Correct Predictions	Probability
Brand Loyalty	15	14	.001
Relative Advantage	16	13	.011
Interest	16	10	.227
Venturesomeness	16	6	.671
Opinion Leadership	15	10	.151

In assessing these results it should be noted that this test is a rather crude one. It tests for the direction of the effect and does not account for

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[11] Both cell A and I are high on brand loyalty, interest, venturesomeness and opinion leadership. They differ in that cell A is also high on relative advantage, while cell I is low. Thus the model predicts a higher trial rate for cell A.

either magnitude or sample size considerations. Nevertheless, this test indicates that in terms of the predicted direction of the result, brand loyalty and relative advantage appear to be excellent predictors. The results for opinion leadership and interest are more clouded. The result for venturesomeness seems to indicate little contribution. Our ability to explain this failure of the model on a post hoc basis is rather strong. Due to the purchasing span which was used -- twenty-five trials -- the lack of venturesomeness was not sufficient to prevent households from trying Crest. The impact of this variable should show up more clearly for a shorter purchasing span.

By considering pairwise comparisons of each cell at the bottom of the table within each brand loyalty group, the final categories may all be ranked along a continuum of predicted percent of triers.

> These rankings may be obtained in a rather simple fashion by scoring a "1" for each variable on which that group is rated as high and a "0" otherwise. The groups are then ranked according to their total scores across all variables. In essence, we are assuming that the effect of each variable is equal.[12]

This procedure leads to a number of ties. All cells which were tied were collapsed into single cells so that five groupings were obtained. For the high brand loyal group Kendall's tau was for the ranking of these five groups +1.00 ($p < .01$). For the low brand loyal group tau was +0.40 ($p < .10$).

The above results seem reasonably consistent with the prior model. We turn now to an analysis of what we term the maximum contrast group.

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[12] A more powerful test could be made if we could make a prior specification on importance.

Maximum Contrast Groups

Within each brand loyalty group we have defined the maximum contrast groups as those groups for which all households are either high on all the predictor variables or low on all the predictor variables. It is important to note that we have chosen the maximum contrast groups a priori on the basis of the predictor variables and not upon how they happen to relate to the chances of a Crest trial in our particular data.[13]

In our analysis below, we shall term our behavioral hypothesis that Relative advantage, Interest, Venturesomeness, and Opinion Leadership should relate to trial of Crest as the RIVOL hypothesis. The cell in which households are all high on these variables will be termed High RIVOL, while the cell which is low is termed Low RIVOL.

The first rather simple analysis is to compare the proportion of a High RIVOL cell which tried Crest to that of a Low RIVOL cell. For the high brand loyals we have:

P(Trial | High RIVOL) = 0.710 on n = 93 households

P(Trial | Low RIVOL) = 0.366 on n = 71 households

Thus for the high brand loyal group, households who were high RIVOL were about twice as likely to try Crest as households low on RIVAL. This result would seem to indicate strong support for the prior model, in contrast to the implications of the regression analysis. In the case of the low brand loyals the results were:

P(Trial | High RIVOL) = 0.710 on n = 93

P(Trial | Low RIVOL) = 0.366 on n = 71.

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13 The specification of the maximum contrast groups independently from the responses obtained in the sample is important if we are to avoid merely taking maximum advantage of a chance outcome.

As a final analysis of the [illegible] contrast groups we present a two-way analysis of variance on the proportion of trials.[14] The results are presented in Table 3 . The results indicated a substantial effect from RIVOL but an insignificant effect from brand loyalty in the maximum contrast groups. The interaction effect is insignificant. On the whole, these results again seem to indicate that the behavioral variables contain predictive power which was masked in the regression.

Table 3

Analysis of Variance of Proportion of Trials

Analysis Sample

Brand Loyal

A) Data

RIVOL	High	Low
High	[illegible] = 1.71	[illegible] = 1.71
Low	[illegible] = 1.37	[illegible] = 1.41

B) ANOVA Results

Source	Effect	Standard Error
RIVOL	[illegible]	[illegible]
Brand Loyalty	[illegible]	[illegible]
Interaction	[illegible]	[illegible]

[illegible] SAMPLE RESULTS

The tree analysis results for the validation sample are presented in Table 4. In view of the previous results, we chose not to replicate the regression analysis. The pairwise comparison of the terminal cells on each of the variables is given in Table 5. Once again, brand loyalty

[14] See Snedecor and Cochran (1967), pp. 419-20.

TABLE 4

TREE ANALYSIS OF TRIERS: VALIDATION SAMPLE

HIGH BRAND LOYAL PURCHASES (427/993=.43)

High Brand Loyal Total Households	210/427 = .492[e.g. $\frac{\text{triers}}{\text{\# in cell}}$ = % of triers]															
Relative Advantage	HIGH 154/99 = .506								LOW 56/169 = .332							
Interest	High 50/99 = .506				Low 104/159 = .655				High 13/26 = .500				Low 43/143 = .300			
Venture	High 29/56=.518		Low 21/43=.489		High 72/97=.742		Low 32/62=.516		High 7/12=.584		Low 6/14=.429		High 20/58=.345		Low 23/85=.270	
Opinion Leadership	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
	12/27 =.445	17/29 =.586	11/26 =.423	10/17 =.589	7/12 =.584	55/85 =.648	6/9 =.667	26/53 =.491	6/8 =.750	1/4 =.250	1/4 =.250	5/10 =.500	5/9 =.555	15/49 =.306	1/7 =.143	22/78 =.282

Key: See Table 1

TABLE 4 (continued)

TREE ANALYSIS OF TRIERS: VALIDATION SAMPLE

LOW BRAND LOYAL PURCHASERS (566/993 = .57)

Low Brand Loyal Total Households	376/566 = .664															
Relative Advantage	HIGH 247/343 = .720								LOW 129/223 = .578							
Interest	High 74/108 = .686				Low 173/235 = .736				High 26/43 = .605				Low 103/180 = .572			
Venture	High 45/64=.703		Low 29/44=.660		High 103/141=.730		Low 70/94=.745		High 10/17=.588		Low 16/26=.615		High 54/89=.607		Low 49/91=.539	
Opinion Leadership	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
	23/36 =.640	22/28 =.786	15/26 =.577	14/18 =.778	24/34 =.705	79/107 =.739	7/9 =.779	63/85 =.742	8/13 =.615	2/4 =.500	6/12 =.500	10/14 =.715	6/12 =.500	48/77 =.624	8/19 =.421	41/72 =.570

and relative advantage showed up most strongly. However, in this case, venturesomeness does somewhat better, while opinion leadership does very poorly.

The terminal category ranking analysis was less clear cut for the validation sample. The rank order correlation (Kendall's tau) for the high brand loyals slipped to 0.4 (at a p-level of 0.242), while tau for the high brand loyals was 0.2 (at a p-level of 0.408). One reason this result did not hold up well on the validation sample may be related to the magnitude of the effects contributed by the various RIVOL variables.

Table 5

Pairwise Comparison of Predictor Variables
Validation Sample

Variable	Number of Comparisons	Number of Correct Predictions
Brand Loyal	16	14
Relative Advantage	16	15
Interest	16	9
Venturesomeness	16	10
Opinion Leadership	16	5

For the maximum contrast groups in the validation sample we had for the high brand loyals

$P(\text{Trial} \mid \text{High RIVOL}) = 0.444$ with $n = 27$

$P(\text{Trial} \mid \text{High RIVOL}) = 0.2815$ with $n = 78$

and for the low brand loyals

$P(\text{Trial} \mid \text{High RIVOL}) = 0.639$ with $n = 36$

$P(\text{Trial} \mid \text{Low RIVOL}) = 0.569$ with $n = 72$.

While the relative impact of RIVOL continuous to show up for both the high and the low brand loyals, we note that the magnitude of the effect is somewhat diminished. However, results again are consistent with our prior model.

Finally, the validation sample results for the two-way analysis of variance on proportions are given in Table 6 . The interaction effect between RIVOL and brand loyalty in the maximum contrast groups again is insignificant. The RIVOL effect is somewhat diminished although the significance level is 0.062 using a normal approximation. Brand loyalty exhibited a strong effect in the validation results.

Table 6

Analysis of Variance of Proportions

Validation Sample

A) Data

RIVOL	Brand Loyalty: High	Brand Loyalty: Low
High	12/27 = .444	23/36 = .639
Low	22/78 = .282	41/72 = .569

B) ANOVA Results

Source	Effect	Standard Error
RIVOL	.112	0.073
Brand Loyalty	.260	0.066
Interaction	.092	0.147

CONCLUSIONS

The overall predictive power of the prior model was rather encouraging in view of the many gross assumptions required for the development of this model. This predictive ability showed up much more clearly in the tree analysis than in the regression analysis. The superiority of trees for

analysis was not su prising since this approach makes far fewer assumptions about the data.

Only further analysis will yield a definitive answer to whether this type of data should be routinely collected. Work must be done on structuring more appropriate scales and indices for the behavioral variables. These should then be used to predict a wide variety of market behavior such as brand loyalty, store loyalty and deal proneness. Once we have gained this additional experience, we should be in a position to assess the benefits which acrue from this type of data. What this study has shown, is that this further pursuit seems very worthwhile.

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BASEMENT

Date Due

MAY 4 '77		
MAY 25 '77		
JUN 06 '77		
MAY 17 '88		
OC 15 '89		

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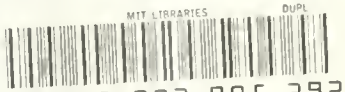

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